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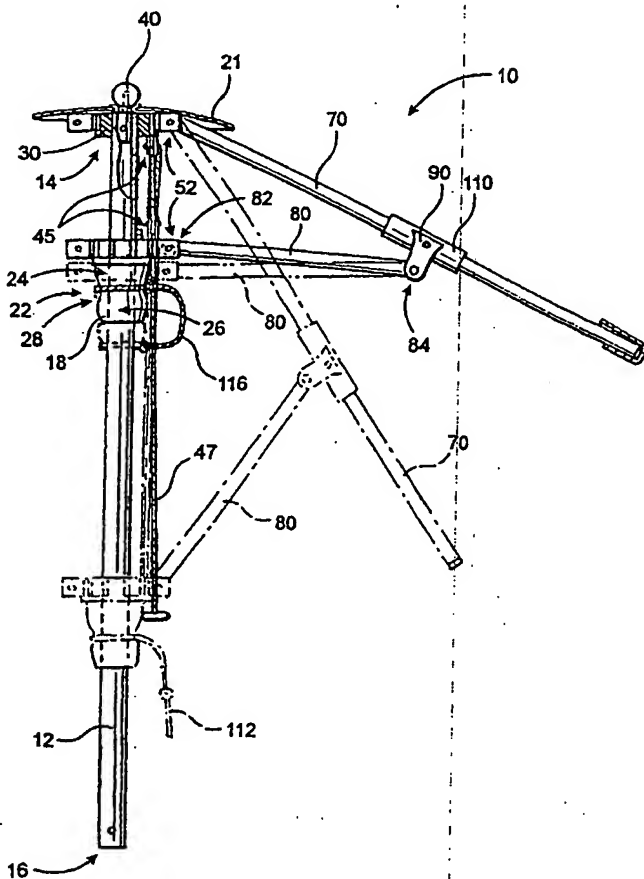
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(54) Title: UMBRELLA FRAME AND OPERATING SYSTEM



(57) Abstract: The present invention relates generally to an umbrella, and more particularly, to a durable and versatile umbrella frame (10) designed to more readily endure abusive weather conditions and that may be quickly, easily and inexpensively repaired. In accommodate umbrella canopies of different sizes and shapes. The present invention is also directed to an umbrella operating system which allows for the simple opening, closing and locking of an umbrella while allowing the frame to freely rotate about the pole, wherein the pole is held in a stationary position. The umbrella includes a pair of hub members (18, 30) mounted about a pole member (12) wherein the lower hub member (18) is slidable up and down the pole (12). A pulley system (45, 130) with locking cam member (140) may be employed to allow the umbrella to safely and easily open to any desired level. A locking stabilizer arm (80) may be used to secure the main hub member (18) in the fully open position and a stabilizer base (120) provides strong support to the pole member to help it withstand severe weather conditions. The umbrella is rotatable about the pole axis regardless of the degree to which it is opened.

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DescriptionUMBRELLA FRAME AND OPERATING SYSTEM5 BACKGROUND OF THE INVENTIONField of the Invention

10 This invention relates generally to umbrellas, and more particularly to a durable and versatile umbrella frame designed to more readily endure abusive weather conditions. The present invention also relates more particularly to an umbrella operating system having improved stabilization qualities and customization features.

15 Description of the Related Art

Outdoor umbrellas are employed to shield people from the sun, wind, rain, and other elements of nature. As such, they are intentionally designed to withstand these elements. Nevertheless, damage to the framework of an umbrella can and does occur for many reasons, particularly to umbrellas in geographical areas of severe and unexpected weather, as well as umbrellas which have been improperly installed. Many prior art umbrellas suffer the disadvantages of not being able to withstand harsh weather as well as not being capable of simple repair when damage does occur. For example, an umbrella having static wire, rigid line and an unbalanced construction at the rib and strut pivot point will wear and often break when extreme forces are applied over time. Once an umbrella is damaged, it is often more expensive and difficult to repair the umbrella than to have it replaced.

30 For umbrellas having individual pivotal connections between the upper rib and lower strut assembly, the unbalanced nature of the movement at the pivot point in relation to the upper and lower central hubs causes unnecessary wear on the pivot junction as well as to the static wire or rigid line which connects the canopy rib assembly to the central hubs. This wear is undesirable and is aggravated over time by the stresses of both man and nature.

For umbrellas having individual pivotal connections between

the upper rib and lower strut assembly by means of a vertically configured bracket individually, the existing plastic brackets protrude over the top of the canopy assembly providing a point of friction between the fabric of the canopy and the rigid protrusion of the picot bracket. This creates excessive wear on a fabric canopy and often creates holes in the fabric canopy.

Various umbrella frames are described, for example, in the following U.S. Patent No.: D25,368 to Sparry; D56,043 to Weinberg et al.; 2,336,116 to Morando; 3,17,882 to Militano; 4,368,749 to Lindler et al.; 4,834,126 to Sweet, Jr.; and 5,715,853 to Lin. None of these umbrella frames shows the connection of a central hub with a secondary hub in a manner which allows for the quick exchange of components so as to allow the customization of the size and shape of the canopy member atop the umbrella frame.

In addition to the foregoing, many have tried to simplify and improve the operational features of the umbrella as well as to add structural stability to the typical umbrella. However, many such efforts have required the use of a crank to open and close the umbrella or require placing one's hand in a compromising position in order to lock and unlock the umbrella from its open position. Such action is often troublesome and inconvenient, and can result in injury.

Accordingly, there remains a need in the art for an umbrella which is structured to withstand high winds and other abusive weather, which in addition, may be quickly, easily and inexpensively repaired. If any such umbrella were developed, it would preferably also be easily modified to accommodate umbrella canopies of different sizes and shapes. Further, if any such umbrella were developed it would preferably include a pulley system for allowing the umbrella to be easily opened and adjusted to various degrees and then simply locked in place. Finally, if any such umbrella were developed it would preferably also include a stabilizing system for better supporting the umbrella and providing a safer, more effective way to lock and unlock the umbrella in its fully extended position.

Summary of the Invention

The present invention is designed to address these and other needs which remain in the art and relates primarily to a durable outdoor umbrella frame that will withstand extreme forces and that may be quickly, easily and inexpensively repaired. In addition, the present invention is also easily modified to accommodate umbrella canopies of different sizes and shapes. Accordingly, and as explained more in detail subsequently herein, the present invention includes a pair of hub members mounted to an umbrella pole member wherein one hub member is slidable between the top and bottom ends of the pole. In addition, the hub members are rotatable about the pole. The hub members include a plurality of slots about their radial edges for receiving a combination of hub connector joints. A matching number of ribs and struts are pivotally secured to each hub by these joints, and the struts are pivotally secured to the ribs by collar members. The hub connector joints and the collar members are easily mounted and replaced, and assist in the smooth operation of the umbrella frame. Additionally, the collar members maintain a low profile so as to avoid contacting and thereby potentially damaging a mounted canopy.

The present invention also provides a versatile umbrella operating system which allows an umbrella to be safely and easily opened to almost any degree, easily rotated, and securely stabilized. As such, the present invention includes a pulley system to allow the umbrella to be easily adjusted to almost any degree of openness and simply locked in place. The operating system may include a stabilizing arm to bolster support to the umbrella and provide a safer, more effective way to lock and unlock the umbrella in its fully extended position. In addition, a base plate member having a flip lid attachment may be employed to provide stability at the bottom end of the umbrella, as well as to provide a means to keep the umbrella base opening covered when the umbrella is removed.

One primary object of the present invention is to provide an umbrella frame capable of withstanding very hot and cold

temperatures, high wind conditions and other harsh weather.

It is another object of the present invention to provide an umbrella frame which can be easily manipulated to allow the attachment of canopies of varying shapes and sizes.

5 It is a further object of the present invention to provide an umbrella frame capable of simple rotation.

It is another object of the present invention to provide an umbrella frame having easily replaceable and interchangeable parts.

10 Another important object of the present invention is to provide an umbrella assembly capable of being opened to any desired level.

Yet another object of the present invention is to provide an umbrella assembly capable of being opened to any desired level while at the same time being rotatable.

15 Still another object of the present invention is to provide an umbrella assembly which eliminates the need for a crank lift to open and close the umbrella assembly.

It is yet another object of the present invention to provide an umbrella assembly which eliminates the need for a security pin beneath the lower movable hub member to retain the umbrella in the open position.

It is another object of the present invention to provide an umbrella assembly having a safe and effective base stabilizer.

25 The foregoing list of objects for the invention is meant to be illustrative only and should not be considered to be limiting in any sense. As such, these and other objects, features and advantages of the present invention will become more clear and/or may be gleaned from the detailed description of the invention in various preferred embodiment(s), set forth below.

#### Brief Description of the Drawings

35 Figure 1 is a partial exploded front elevational view in partial cross-section of an umbrella frame assembly of the present invention, utilizing a security pin, with the umbrella closed position shown in phantom.

Figure 2 is an exploded perspective view of a preferred main hub member and a secondary hub member according to the present invention and also illustrating preferred hub connector joints.

Figure 3 is an exploded perspective view of a preferred collar member of the present invention.

Figures 4 through 8 are top schematic views showing examples of different canopy shapes which may be employed with the present invention.

Figure 9 is a partial front elevational view in partial cross-section of the umbrella frame assembly, shown with a double pulley system.

Figure 10 is a partial front elevational view of one embodiment of the umbrella operating system of the present invention, shown with stabilizer bar and base member and with the open position of the umbrella shown in phantom.

Figure 11 is an exploded perspective view of the stabilizer base member portion of the umbrella operating system of the present invention.

Figure 12 is a partial side elevational view of one embodiment of a pulley system of the umbrella operating system of the present invention.

Figure 13 is a partial front elevational view of one embodiment of the pulley system of the umbrella operating system of the present invention.

Figure 14 is a partial side elevational view of one embodiment of the pulley system of the umbrella operating system of the present invention.

Figure 15 is a partial perspective view of one embodiment of the pulley system of the umbrella operating system of the present invention.

#### Detailed Description of the Preferred Embodiment(s)

As shown throughout the various Figures, the present invention relates to an improved umbrella frame and operating assembly.

With initial reference to Figures 1 through 8, an improved

umbrella frame assembly, generally indicated by reference numeral 10, according to the present invention will now be described. The umbrella frame assembly 10 is intended for use in easily and quickly supporting a variety of shapes and sizes of umbrella canopies, and is structured to be both durable and weather resistant. As illustrated in Figure 1, the frame assembly 10 includes a longitudinally extending pole member 12 which can be made of wood, aluminum or other material. In one embodiment, the pole member is made of 40 gauge aluminum. The pole member 12 has a top end 14 and a bottom end 16. The bottom end 16 may be easily secured to the ground or any means of vertical affixment, such as but not limited to a reinforced concrete base, which for example, might have a star knob and hitch pin. The frame assembly 10 also comprises a main hub member 18 having a central cavity 20 extending axially therethrough is secured about the central pole member and is slidable between the top 14 and bottom 16 ends of the pole member. The main hub member 18 is also capable of rotating about the pole member axis. In one embodiment of the invention, as shown in Figures 1 and 3, the main hub member 18 is provided with a substantially "hour glass" shaped base portion 22 having upper 24 and lower 26 portions and a waist portion 28 which is of smaller diameter than the upper and lower portions. The base portion shape allows for simple hand manipulation of the hub member 18 up and down the pole member.

As shown in Figures 1 and 2, an upper or secondary hub member 30 is provided near the top end 14 of the pole 12. The secondary hub member 30 is provided with a central cavity 32 extending axially therethrough, wherein the cavity includes a pole receiving portion 34 and a narrower upper portion 36 which extends through an interior wall 38 of the secondary hub member. The interior wall 38 maintains the hub member in position at the top end 14 of the pole 12. The hub members 18, 30 may be made of injecting molded thermoplastic, such as DELRIN with TEFLON, for example, so as to resist rust, UV degradation, dry rot, and water damage. Other rigid and/or flexible materials may be used.

As illustrated in Figure 1, in the preferred embodiment of



the present invention, a threaded bolt 15 extends from the central pole 12 through the narrow upper portion 36 of the secondary hub member central cavity 32. A nut 17 tightened about the bolt 15 is capable of maintaining the secondary hub member 30 in substantially rigid position about the pole 12. When desired, the nut 17 may be loosened so as to allow the secondary hub member to rotate about the pole axis. A finial or end cap 40 is also secured to the bolt 15 for aesthetic purposes once a canopy has been positioned atop the frame assembly. The end cap also maintains the fabric canopy in a secured central position.

As shown in Figure 2, the main 18 and secondary 30 hub members are further provided with slots 42 formed at intervals about their respective radial edges 44. The slots 42 are three sided and include a base 46, a back wall 48, and a pair of side walls 50. The back wall faces radially outwardly from the hub members 18, 30 and the side walls extend outwardly from the slot back wall 48 at diverging angles. In one embodiment of the invention, the slots are approximately 1/4 inch in depth and the slot back wall is approximately 3/4 inches in width.

As is also shown in Figure 2, hub connector joints 52 are insertable within the hub member slots 42 and may be secured therein by screws 54, for example. The hub connector joints may be made of injection molded thermoplastic or stamped metal, for example. The hub connector joints are provided with a base portion 56 and a pair of substantially parallel side walls 8 which define an interior aperture 60. The hub connector joints also have a back face 62 and a pair of corner walls 64 which extend outwardly from the back face 62 at diverging angles. The back face 62 and corner walls 64 mate respectively with the slot back wall 48 and slot walls 50. Thus, the angles with which the corner walls 64 and slot side walls 50 diverge from the back face 62 and slot back wall 48, respectively, are substantially identical. In one embodiment of the invention, this angle is approximately 104 degrees. Providing the slots 42 with three walls 62, 64 and a base portion 56 ensures a snug fit of the hub connector joints within the hub member slots and helps prevent the joints 26 from

twisting or displacing under stress. Further, the depth and width of the slots allow the hub connector joints to be readily secured and removed from within the slots using a screw 54, as shown in Figure 2. While a screw member is shown as the means of attachment for the hub connector joints within the hub member slots, other forms of attachment may be employed, such as a machine threaded bolt, fitted notch or other element which allows the hub connector joints to be easily attached and removed. As shown in Figure 2, the interior surface 66 of the hub connector joints 26 may be rounded and substantially U-shaped so as to provide clearance for rib and strut members, as described hereinafter. In the embodiment of the invention as shown in Figure 2, the hub members 8, 30 are provided with eight slots 42 so as to accommodate up to eight hub connector joints 52. Other numbers of slots may be utilized as well.

As shown in Figures 1 and 3, rib members 70 are pivotally secured to the hub connector joints 52 of the secondary hub member 30. The rib members 70 form the outer framework of the umbrella frame of the present invention. Strut members 80 are pivotally secured at a first end 82 to the hub connector joints 52 of the main hub member 18 and are pivotally secured at a second end 84 to the rib members 70 at a point near the approximate midpoint of the rib members. The strut members 80 provide support for the rib members when the umbrella frame is in the extended or open position. Pivotal attachment of the rib and strut members to their respective hub connector joints may be exacted using a single screw 54 extending through the hub connector joint and rib or strut member, machine threaded bolt, fitted notch or other like joinery that allows the hub connector joints to be easily replaceable. The rib and strut members may be made of aluminum or wood, for example.

As shown in Figure 3, the strut members 80 are pivotally secured to the rib members 70 by a collar member 90. The collar member 90 includes a pair of substantially parallel outer walls 92 and a central divider wall 94 which includes a pair of substantially parallel outer walls 92 and a central divider wall 94 which

combine to define an upper channel portion 96 and a lower slot portion 98 on opposite sides of the divider wall 94. The upper portion 100 of the collar member outer walls 92 which define the channel portion 96 includes outwardly diverging side edges 102 and a substantially flat top edge 104. The channel portion 96 may have a substantially rounded interior surface 106 adapted for receiving the rib members. When the rib members are in a substantially different shape, the channel portion 96 may be adapted to match that shape. As shown in Figure 3, the channel portion interior surface 106 extends around over one half the circumference of the rib member. As shown in Figure 3, the rib members 70 may be secured within the collar member channel portion 96 by a screw 91 and nut 93. The substantially flat top edge 104 of the collar member avoids contact with the umbrella canopy which is positioned over the rib members and thereby helps prolong the life of the canopy employed. The strut members 80 are pivotally secured to the slot portion 98 of the collar member 90 by a screw 91 and nut 93, as shown in Figure 3. Also, as shown in Figure 3, a substantially cylindrical sleeve member 110 may be employed between the collar member 90 and the rib member 70 to reinforce the support provided by the strut member 80 to the rib member 70. In one embodiment of the invention, the sleeve member 110 is made of aluminum.

As discussed more fully later herein with reference to Figures 9 through 15, the main hub member 18 may be secured in position along the pole in several ways. However, and as shown in Figure 1, one way utilizes a retaining pin 112 attached to the main hub member 18 which can be placed within a retaining pin slot 114 in the pole 12 in order to maintain the vertical position of the main hub member 18 along the pole. The pin 112 is secured to the main hub member so as to allow the free rotation of the hub members 18, 30 about the pole even when the pin 112 is in place within the pin retaining slot 114. As shown in Figure 1, the pin 112 is maintained around the waist portion 28 of the main hub member by a looped line 116 which allows the main hub member to rotate without binding the line. The main hub member may also be

formed of two pieces and may employ ball or roller bearings or the like to allow the two pieces to move independently of one another in a lateral direction, while still moving as a single unit up and down the pole. Such an arrangement allows the retaining pin to remain within its slot and thereby maintain the main hub member in the upper, frame extended, position while allowing the umbrella canopy frame assembly to be freely rotated about the pole axis.

In operation, any desired number and size of rib and strut members may be employed, depending on the particular size and shape of the umbrella canopy to be attached. Because the hub connector joints and collar member are so easily installed, many different configurations of the canopy can be achieved with little effort by either increasing or decreasing the number of hub connector joints present on the hub members. For example, as shown in Figures 4 through 8, four rib members 40 are employed for the square shaped canopy 122 (Figure 4), eight rib members 40 are employed for the octagonal shaped canopy 124 (Figure 5), three rib members 40 are employed for the triangular shaped canopy 126 (Figure 6), six rib members 40 are employed for the rectangular shaped canopy 128 (Figure 7) and five rib members 40 are employed for the semi-octagonal shaped canopy 130 (Figure 8). The number of ribs to be employed determines the number of strut members, hub connector joints, and collar members to be employed. For example, with four rib members, four strut members, eight hub connector joints, and four collar members are employed. For proper operation, the hub connector joints must be secured within corresponding slots in the main and secondary hub members. Other geometrical shapes and sizes of canopies may also be employed using the frame assembly of the present invention.

Canopies of varying shapes and sizes are attached to the umbrella frame by unscrewing the finial or end cap 40 from the top end 14 of the pole 12 and removing the securing nut 17. The canopy opening is placed over the threaded bolt 15 and the canopy cuffs are placed around the outer ends of the rib members. The securing nut 17 and end cap 40 are then placed back onto the threaded bolt 15. In one embodiment of the invention, the canopy

members are SUNBRELLA 100% solution-dyed acrylic canopies or any other shade-like or non-shade like material.

When the frame is in the retracted position, as shown in phantom in Figure 1, the main hub member 18 is near the bottom end 16 of the pole. As the main hub member 18 is lifted up the pole, the strut members 80 extend outwardly, thereby expanding the rib members 70 and opening the attached canopy 21. As the strut members 80 pass the point where they extend perpendicularly from the pole member 12, the strut members 80 lock into place against a hub stop member 120 secured to the pole, as shown in solid lines in Figure 1. A retaining pin member 112, described more fully below, can then be placed within a slot 114 formed on the pole and the hub member 18 may then be returned downwardly to rest against the pin member 112. In this position, as shown in the dashed lines in Figure 1, the strut members 80 extend in a substantially perpendicular fashion from the pole member 12 to provide substantial support to the rib members 70.

The hub connector joints 52 and the collar members 90 are considered to be important inventive steps forward which significantly improve the structural and long term integrity of the umbrella unit. First, the upper portion 100 of the collar member walls 92 remain below the height of the rib members; thus, the collar members 90 avoid contacting the canopy during operation of the umbrella. Such contact could significantly damage the fabric of the canopy. Secondly, the collar members 90 and the hub connector joints 52 help maintain the rib and strut members in perfect alignment so that the two independent hubs act in concert throughout the continual opening and closing of the umbrella frame. The upper channel portions 96 of the collar members 90 cradle the rib members 70 and the slot portions 98 of the collar members as well as the hub connector joint apertures 60 straddle their respective ends of the rib 70 and strut 80 members and allow ease of pivotal motion. Due to the interchangeable and easily replaceable nature of the hub connector joints and collar members, a broken umbrella may be repaired quickly, easily and with minimal cost to the consumer. Different textures and colors of the hub

members, the hub connector joints, and the collar members are also available.

5 The umbrella frame 10 may also be easily rotated by loosening the end cap 40 and securing nut 17 from the pole top end 14 rotating the hub members 18, 20 to their desired location. The umbrella frame 10 may also employ a pulley system, described more in detail below, such as that shown in Figure 9 at reference numeral 45, to allow the user to pull the pulley cord 47 to initiate the raising of the main hub member and thereby the opening of the umbrella.

10 With reference now to Figures 9 through 15, the improved umbrella operating system, generally indicated by reference numeral 100, of the present invention will now be described, which is advantageously used in stabilizing an umbrella and in easily and quickly opening, closing and rotating an umbrella.

15 As mentioned previously herein, the main hub member 18 may be secured in position along the pole in several ways. As an example, Figure 1 illustrates the invention utilizing a retaining pin 112 attached to the main hub member 18 which can be placed within a retaining pin slot 114 in the pole 12 in order to maintain the vertical position of the main hub member 18 along the pole. Alternatively, the main hub member 18 may be maintained in position along the pole using a stabilizer arm, as shown in Figure 10, or the pulley system as shown in Figures 12 through 15.

20 As shown in Figure 10, the main hub member 18 may be stabilized in position about the pole member using a stabilizer arm 150. The stabilizer arm 150 is pivotally secured at one end 152 to a strut member 80 by a collar member 154 similar to collar member 90. The second end 154 of the stabilizer arm 150 is provided with a securing member 156 for insertion into a stabilizer opening 13 on the pole member. In one embodiment of the invention, securing member 156 is a set screw. The securing member 156 may also be a pinchable clamp member or other component capable of simple insertion and removal from the stabilizer opening. The stabilizer arm's second end 152 is also provided with a locking strap member 158 which can be positioned around the

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pole and locked together such as by using a snap 159 for added support and to ensure that securing member 156 does not unintentionally slip out of position from within the stabilizer opening 13. Using the stabilizer arm, the umbrella main hub member 18 can be lifted and lowered without having to use a crank member or a retaining pin member at a location high up on the pole. This facilitates the overall ease of use of the umbrella in quickly opening, securing, and closing the umbrella canopy.

As shown in Figure 9 and Figures 12 through 15, the main hub member 18 may also be moved up and down the pole member using a pulley system 45 or 130. The pulley system allows for an effortless lift of the main hub member and eliminates the need for a crank lift or a security pin beneath the lower movable hub. The pulley system portion of the present invention allows the remote locking of the lower movable hub without impeding the rotation of the entire canopy assembly.

In the embodiment of the invention as shown in Figure 13, the pulley system includes a line member 132 having a first end 134 secured to a bracket member 136 which is secured to the top surface 22 of the main hub member 18. The line member 132 may be a length of rope, for example. In this embodiment, a pulley member 138 is secured to the bottom surface 23 of the secondary hub member and a cam cleat member 140 is secured to the side surface 26 of the main hub member. The pulley member 138 may be a typical pulley having a grooved wheel 180 rotatably mounted to a collar member 182 wherein the collar member is movably secured to a bracket member 184. The pulley securing system of the present invention allows the operator to open the umbrella to any desired level without any additional locks, pins, or levers by simply pulling the line through the automatic locking cam cleat member.

As shown in Figure 13, the cam cleat member 140 includes a pair of cams 141 each having a toothed side edge 142, and a retaining bracket portion 144. The cams 141 are pivotally mounted to the side edge 26 of the main hub member 18 and the retaining bracket 144 is mounted to the cams 141. In the cam resting

position, as shown in Figure 13, the toothed side edges 142 face one another. In this embodiment, the line member 132 extends from the bracket member 136 through the pulley member 138 and down through the cams 141. A handle is secured to the second end of the line member 132 to promote ease of operation.

Using the pulley system when the umbrella is in its closed position with the main hub member near the pole member bottom end, the user can pull the line member handle whereby the line member will be pulled through the pulley member and the cam cleat teeth 142. This will cause the cams to pivot such that the line will continue to be pulled against the cam smooth outer surfaces 145. This will pull the bracket 136 and main hub member 18 upward so as to open the umbrella. When the user stops pulling the line member, the cams will reverse pivot and the locking teeth will prohibit the movement of the line in either direction. The main hub member will thereby be held in a stable position about the pole member. In this way, the umbrella can be quickly and easily opened to any desired level without the use of a hand crank or a retaining pin placed below the main hub member. When the umbrella is desired to be closed, the line can be pulled outside of the grip of the teeth and released. The retaining bracket 144 maintains the line in alignment with the cam teeth such that the user can easily help the line re-engage the cam member so as to lock the line at the desired level of openness. Only the intentional removal of the line member from the cam teeth with a deliberate sideways and upward movement will allow the umbrella to close. The locking cam cleat thus prevents any unintentional closing of the umbrella from wind gusts or other outside forces.

As shown in Figure 13, the pulley system of the present invention may include a single pulley member 138 secured to the lower surface 23 of the secondary hub member 30 and a bracket member 136 secured to the top surface 22 of the main hub member 18. The pulley system of the present invention may also include a pair of pulley members 138 secured to the secondary hub member, as shown in Figure 12. In this arrangement, the line member 132 extends from the bracket member through a first pulley member 138



on the secondary hub member, through a pulley member on the main hub member, through a second pulley member 138 on the secondary hub member and down through the cam cleat member 140. Such an arrangement provides a mechanical advantage in balance and lifting power to the device. In one embodiment of this arrangement, the secondary hub member pulley members are spaced substantially radially equidistant from the secondary hub member axis. Other variations on the number of pulley members employed on each hub member may be used. Since the hub members 18, 30 are rotatable about the pole axis, providing a pulley system secured to the hub members provides the umbrella of the present invention with the ultimate in versatility, as the umbrella may be opened and rotated to any desired degree completely free of impediments.

As shown in Figure 13, the line member 132 extends downwardly from the pulley member 138 so as to be substantially coplanar with a main hub member slot wall 44. This keeps the line free from contact with a hub connector joint 52 which could bind and cause unnecessary wear on the line member. Also, as shown in Figure 12, the line member 132 may be retained on a hook member 190 secured to the main hub member side surface 26.

As shown in Figures 14 and 15, the secondary hub pulley members may optionally be secured directly to the pole member 12 by a bracket member 136 which can extend substantially perpendicularly from the pole member, for example. In this embodiment, the hub members are prohibited from rotating about the pole member.

As shown in Figures 10 and 11, the pole member 12 may be stabilized at its bottom end using a support assembly 120. The support assembly 120 includes a base 126 having a plate member 124 secured thereto by a hinge member 123, wherein the plate member 124 has a pin member 122 extending from its inside surface 125. The pin member 122 is receivable by an opening on the pole near the pole bottom end 16. The base 126 includes substantially cylindrical tube portion 127 extending from its bottom surface 128 and an opening 131 extending through the tube 127 for receiving the pole member 12. In one embodiment of the invention, the pole

is provided with a pair of axial slots 133 for mating with a securing rod 135 within the tube 127. The plate member 124 is hingedly secured to the base 126 such that, when the pole member 12 is removed, the plate member 124 can cover the base opening so as to prevent rain, trash, feet and hands, and other like elements from falling into the opening. In one embodiment of the invention, the pin member 122 is a set screw. In a further embodiment of the invention the pin member 122 can be a pinchable clamp member insertable and removable from the pole opening by pinching the sides together. A strap member 127 may also be attached to the plate member 124 and secured about the pole 12 for added support. In one embodiment, as shown in Figure 11, the strap member includes a snapping lock mechanism 137.

The rigidity and density of all the components described herein can be tempered for a desired flexibility as needed. For example, the pole, rib, and strut members may be comprised of metal, wood or fiberglass but their construction would not be limited to these rigid compositions. The nature of thermoplastic construction with materials like ABS, DELRIN, POLYPROPOLYNE and other ACETALS allow for a degree of flexibility in the hubs connector joints, collar members, pulley members and cam cleat members of the umbrella frame. Because these plastics have a degree of flexibility, the energy that normally would be absorbed by a completely static frame umbrella is distributed through all of the plastic components of the umbrella in heavy wind conditions or other harsh weather, and thus, use of such materials is preferable as it should greatly increase the life of the static frame of an outdoor umbrella, which is generally the more costly portion of an umbrella unit.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore

intended to be embraced therein.

Claims

1. An umbrella frame, comprising:
  - a central pole member having a longitudinal axis, a bottom end and a top end,
  - 5 a main hub member secured about said central pole member, said main hub member capable of sliding between said bottom and said top ends, said main hub member also having a radial edge with a plurality of slots formed at intervals thereabout,
  - 10 a secondary hub member secured to said pole member near said pole top end, said secondary hub member having a radial edge with a plurality of slots formed at intervals thereabout,
  - 15 a plurality of hub connector joints, each of said hub connector joints being secured within a respective one of said main and said secondary hub member slots,
  - a plurality of rib members, each of said rib members being pivotally secured to a respective one of said secondary hub member connector joints, and
  - 20 a plurality of strut members each having an inner and an outer end, said inner end of each of said strut members being pivotally secured to a respective one of said main hub member connector joints, said outer end of each of said strut members being pivotally secured to a respective one of said rib members.
  - 25
2. The umbrella frame of claim 1 wherein each of said slots has a base, a back wall and a pair of side walls.
3. The umbrella frame of claim 2 wherein said slot back walls face radially outwardly from said hub members.
- 30 4. The umbrella frame of claim 2 wherein, for each slot, said slot side walls extend outwardly from said slot back wall at diverging angles.
5. The umbrella frame of claim 1 wherein each of said hub connector joints has a pair of corner walls and a back wall, said corner walls extending from said back wall at diverging angles.
- 35

6. The umbrella frame of claim 1 wherein each of said hub connector joints includes a base and a pair of substantially parallel side walls which define an interior aperture.
- 5 7. The umbrella frame of claim 6 wherein each of said hub connector joints further includes a pair of corner walls and a back wall, said corner walls extending from said back wall at diverging angles.
- 10 8. The umbrella frame of claim 1 wherein each of said hub connector joints has an interior surface which is substantially U-shaped.
9. The umbrella frame of claim 1 wherein said hub members are rotatable about said pole axis.
- 15 10. The umbrella frame of claim 1 wherein each of said hub members is provided with eight slots.
11. The umbrella frame of claim 1 wherein said main hub member includes upper and lower portions and a central waist portion, said waist portion being of smaller diameter than said upper and lower portions.
- 20 12. The umbrella frame of claim 1 wherein said strut members are pivotally secured to said rib member by collar members, each of said collar members including a pair of substantially parallel outer walls and a central divider wall, said walls forming an upper channel portion on one side of said divider wall and a lower slot portion on the opposite side of said divider wall.
- 25 13. The umbrella frame of claim 12 wherein said channel portion has a substantially rounded interior surface.
14. The umbrella frame of claim 12 wherein said collar member outer walls have an upper portion which includes outwardly diverging side edges and a substantially flat top edge.
- 30 15. The umbrella frame of claim 13 wherein said collar member interior surface extends around over one-half the circumference of its respective rib member.
- 35 16. The umbrella frame of claim 14 further including a

plurality of substantially cylindrical sleeve members, each of said sleeve members extending about a portion of a respective one of said rib members, and wherein each of said sleeve members is secured within said channel portion of a respective one of said collar members.

17. The umbrella frame of claim 1 further including pulley means for raising and lowering said main hub member.

18. An umbrella frame, comprising:

a central pole member having a longitudinal axis, a bottom end and a top end,

a main hub member secured about said central pole member, said main hub member capable of sliding between said bottom and said top ends, said main hub member also having a radial edge with a plurality of slots formed at intervals thereabout,

a secondary hub member secured to said pole member near said pole top end, said secondary hub member having a radial edge with a plurality of slots formed at intervals thereabout, a plurality of rib members, each of said rib members being pivotally secured within a respective one of said secondary hub members slots,

a collar member secured to each of said rib members, and a plurality of strut members each having an inner and an outer end, said inner end of each of said strut members being pivotally secured within a respective one of said main hub member slots, said outer end of each of said strut members being pivotally secured to a respective one of said collar members.

19. The umbrella frame of claim 18 wherein said collar member includes a pair of substantially parallel outer walls and a central divider wall, said walls forming an upper channel portion on one side of said divider wall and a lower slot portion on the opposite side of said divider wall.

20. The umbrella frame of claim 18 further including a

plurality of substantially cylindrical sleeve members, each of said sleeve members extending about a portion of a respective one of said rib members, and wherein each of said sleeve members is secured within said channel portion of a respective one of said collar members.

21. An umbrella frame comprising:

a central pole member having a longitudinal axis, a bottom end and a top end, said pole member also having a retaining pin slot extending therethrough;

a main hub member secured about said central pole member, said main hub member capable of sliding between said bottom and said top ends, said main hub member also capable of rotating about said central pole axis,

a secondary hub member secured to said pole member near said pole top end, said secondary hub member capable of rotating about said central pole axis,

a plurality of rib members pivotally secured to said secondary hub member,

a plurality of strut members each having an inner and an outer end, said inner ends being pivotally secured to said main hub member, said outer end of each of said strut members being pivotally secured to a respective one of said rib members,

a pin member extendable within said retaining pin slot for maintaining said main hub member in position along the pole member, and

means for securing said pin member to said main hub member so as to allow said umbrella frame to rotate freely about said pole member when said pin member is placed within said retaining pin slot.

22. The umbrella frame of claim 21 wherein said main hub member has upper and lower portions and a central waist portion, said waist portion being of smaller diameter than said upper and lower portions, and wherein said securing means includes a line encircling said waist

portion and secured to said pin member.

23. An umbrella frame, comprising:

a central pole member having a longitudinal axis and top and bottom ends;

a main hub member secured about said central pole member, said main hub member capable of sliding between said bottom and said top ends;

a secondary hub member secured to said pole member near said pole top end;

means for supporting a canopy member;

pulley means for raising and lowering said main hub member along said pole member; and

means for securing said main hub member in a stationary position along said pole member.

24. The umbrella of claim 23 wherein said main hub member includes a top surface and a side surface and wherein said pulley means includes at least one pulley member secured to said secondary hub member, a bracket member secured to said top surface of said main hub member, and a line member having first and second ends, said first end being secured to said bracket member, said line member cooperatively engaging said pulley member and extending downwardly from said pulley member towards said pole member bottom end.

25. The umbrella of claim 24 wherein said securing means includes a cam member secured to said side surface of said main hub member and wherein said line member cooperatively engages said cam member as it extends downwardly from said pulley member.

26. The umbrella of claim 25 wherein said cam member has a rested position and includes a pair of cams pivotally secured to said main hub member side surface, said pair of cams each having a toothed inner side edge, said toothed inner side edges facing one another in said rested position of said cam member.

27. The umbrella of claim 26 wherein said cam member further



includes a retaining bracket secured to each of said pair of cams.

28. The umbrella of claim 24 wherein said main hub member has a top axial end and wherein said top axial end has a radial edge with a plurality of slots formed at intervals thereabout, said slots being individually separated by a respective slot wall.

29. The umbrella of claim 28 wherein said line member extends downwardly from said pulley member in substantially coplanar relation to a slot wall of said main hub member.

30. The umbrella of claim 24 wherein said secondary hub member includes a bottom surface and wherein said at least one secondary hub pulley member is secured to said secondary hub bottom surface.

31. The umbrella of claim 23 wherein said hub members are rotatable about said pole axis.

32. The umbrella of claim 24 further including a hook member secured to said main hub member side surface for hanging said line member.

33. The umbrella of claim 23 wherein said main hub member includes top and side surfaces and wherein said pulley means includes at least one pulley member secured to said secondary hub member, at least one pulley member secured to said main hub member top surface, a bracket member secured to said main hub member top surface, and a line member having first and second ends, said first end being secured to said bracket member, said line member cooperatively engaging said pulley members.

34. The umbrella of claim 33 wherein said secondary hub member includes a pair of pulley members secured thereto and said main hub member includes one pulley member.

35. The umbrella of claim 34 wherein said secondary hub member includes a bottom surface and a central axis and further wherein said secondary hub member pulley members are spaced substantially radially equidistant from said

secondary hub member axis on said secondary hub bottom surface.

5 36. The umbrella of claim 34 wherein said line member extends from said bracket member of said main hub member through a first pulley member of said secondary hub member, through said main hub member pulley member, through a second pulley member of said secondary hub member and downwardly towards said pole bottom end.

10 37. The umbrella of claim 23 wherein said main hub member has top and side surfaces and wherein said pulley means includes at least one pulley member secured to said pole member at a location between said hub members, at least one pulley member secured to said main hub member top surface, a bracket member secured to said main hub member top surface, and a line member having first and second ends, said first end being secured to said bracket member, said line member cooperatively engaging said pulley members.

15 38. The umbrella of claim 37 wherein said at least one pulley member of said pole member extends substantially perpendicularly from said pole member.

20 39. The umbrella of claim 23 wherein said securing means includes a stabilizer arm having first and second ends, said first end being secured to said supporting means, said arm also including means for securing said second end to said pole member.

25 40. An umbrella pole support, comprising:

30 a base member having a top and a bottom surface, said base member also having a substantially cylindrical tube extending from said bottom surface, said cylindrical tube being hollow and defining a base opening;

35 a plate member hingedly secured to said base member top surface, said plate member having an inner surface and an outer surface and being sufficiently large to substantially cover said base opening;

a securing pin member mounted to said plate member inner

surface; and  
a strap member mounted to said plate member.

41. The support of claim 40 wherein said strap member includes a snapping lock mechanism for securing around an umbrella pole.

42. An umbrella, comprising:

a central pole member having a longitudinal axis and top and bottom ends;

a main hub member secured about said central pole member, said main hub member capable of sliding between said bottom and said top ends;

a secondary hub member secured to said pole member near said pole top end;

means for supporting a canopy member; and

a stabilizer arm having first and second ends, said first end being secured to said supporting means, said arm including means for securing said second end to said pole member.

43. The umbrella of claim 42 wherein said pole member includes a stabilizer opening proximate said bottom end and wherein said securing means includes a pin member insertable within said stabilizer opening.

44. The umbrella of claim 42 wherein said securing means includes a strap member.

45. The umbrella of claim 42 wherein said pole member includes a stabilizer opening proximate said bottom end and said securing means includes a pin member insertable within said stabilizer opening and a strap member.

46. The umbrella of claim 42 wherein said stabilizer bar first end is pivotally secured to said supporting means.

47. The umbrella of claim 42 wherein said supporting means includes a plurality of rib members, each of said rib members being pivotally secured to said secondary hub member, and a plurality of strut members each having an inner end an outer end, said inner end of each of said strut members being pivotally secured to said main hub

member, said outer end of each of said strut members being pivotally secured to a respective one of said rib members.

5 48. The umbrella of claim 42 wherein said means for supporting a canopy member includes a plurality of rib and strut members secured to and extending from said main hub member and said secondary hub member.

10 49. The umbrella of claim 42 wherein said stabilizer arm first end is pivotally secured to one of said plurality of strut members.

10 50. An umbrella operating system, comprising:

a central pole member having a longitudinal axis and top and bottom ends;

15 a main hub member secured about said central pole member, said main hub member capable of sliding between said bottom and said top ends;

a secondary hub member secured to said pole member near said pole top end;

means for supporting a canopy member;

20 pulley means for raising and lowering said main hub member along said pole member;

means for securing said main hub member in a stationary position along said pole member, said securing means including a stabilizer arm having first and second ends, 25 said first end being secured to said supporting means, said arm also including means for securing said second end to said pole member; and

30 a pole support member having a base member, said base member having a top and a bottom surface, a substantially cylindrical tube extending from said bottom surface, said tube defining a base opening, said pole support member further having a plate member hingedly secured to said base member top surface, said plate member having pole securing means for securing 35 said pole member within said tube.

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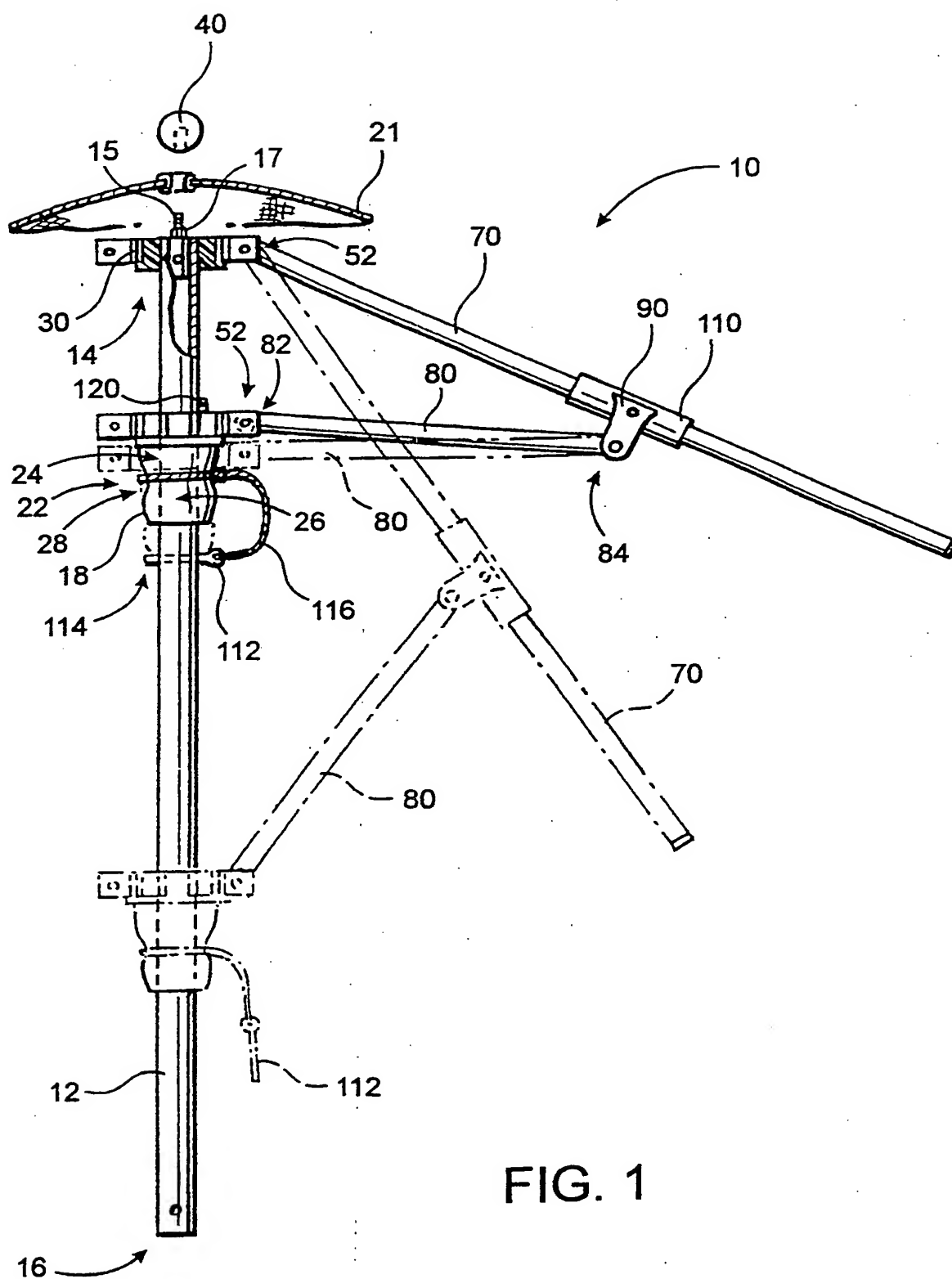
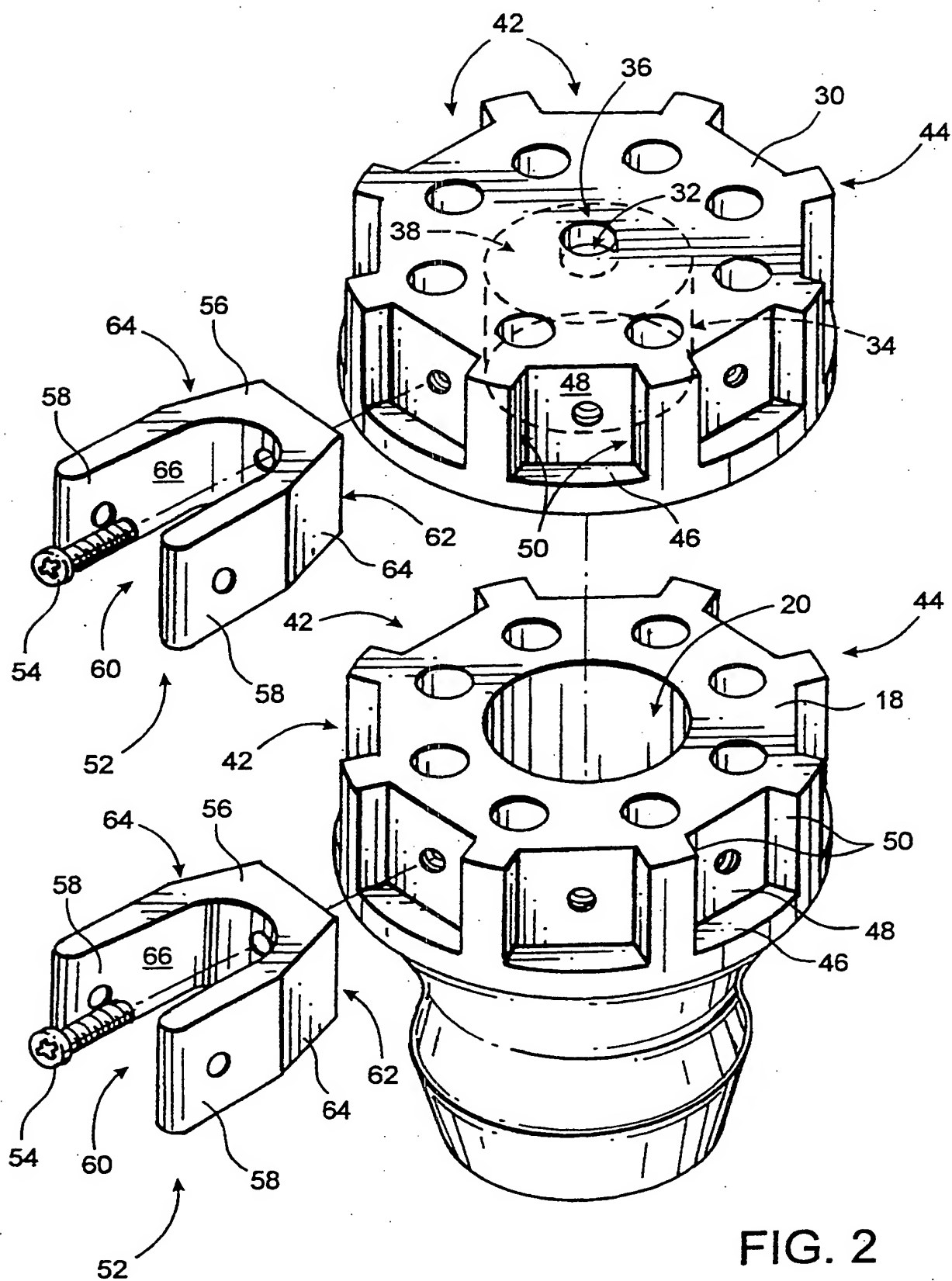


FIG. 1

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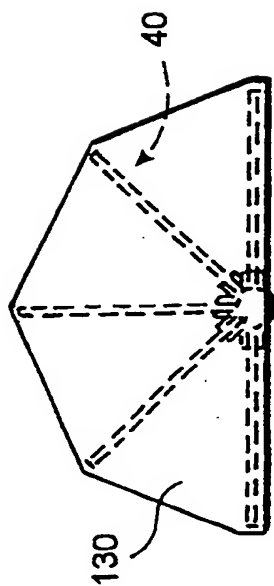


FIG. 8

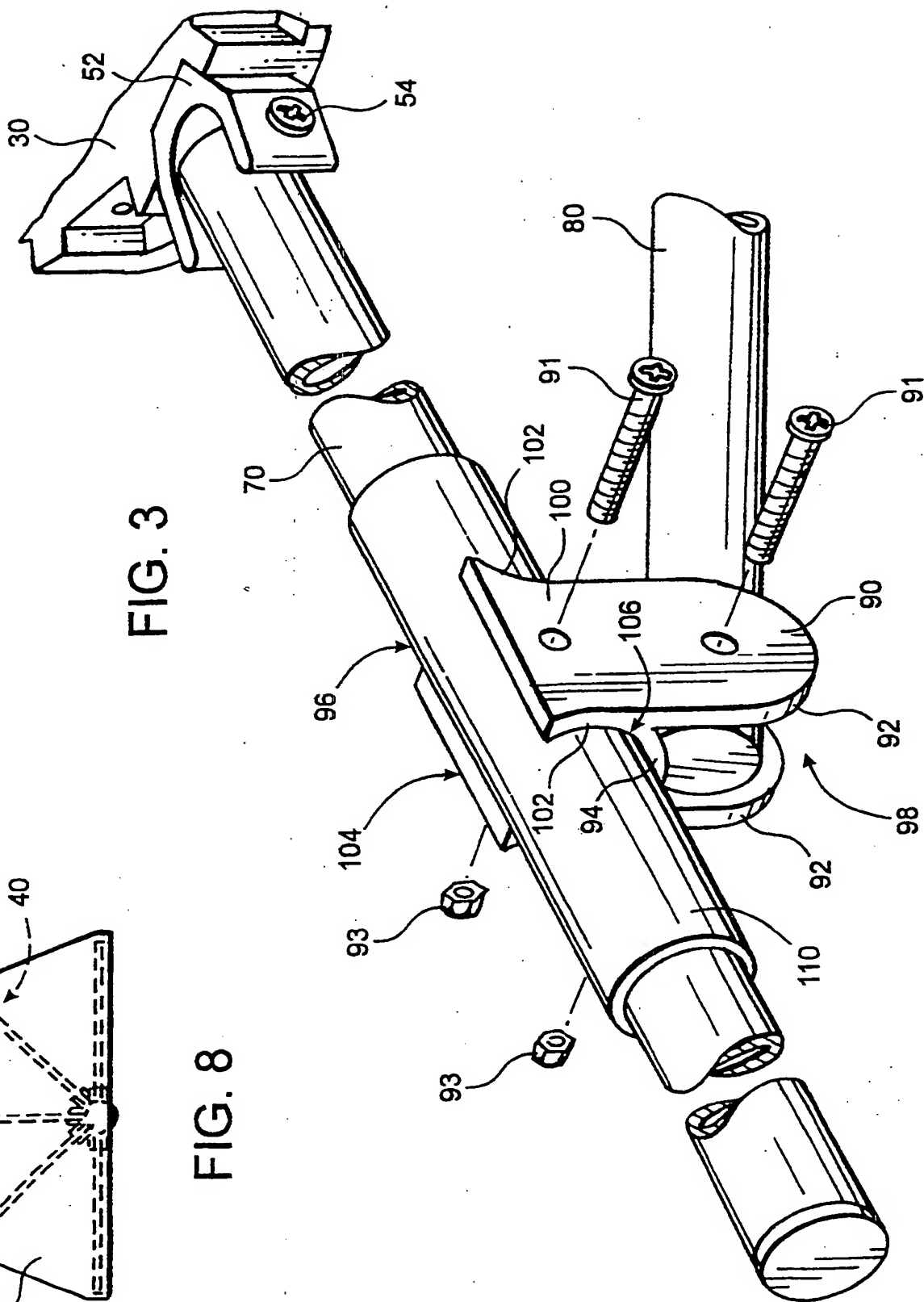


FIG. 3

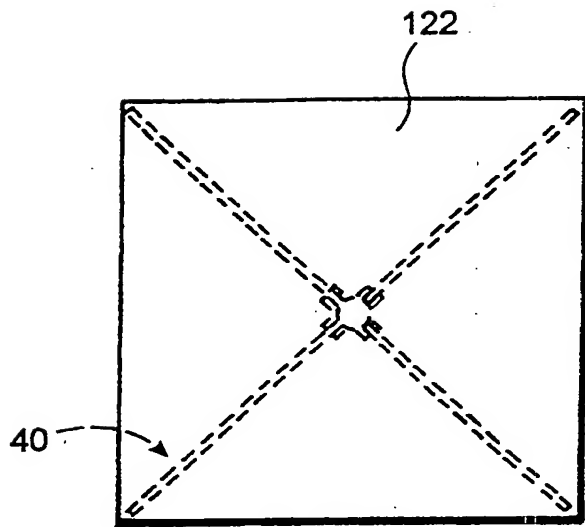


FIG. 4

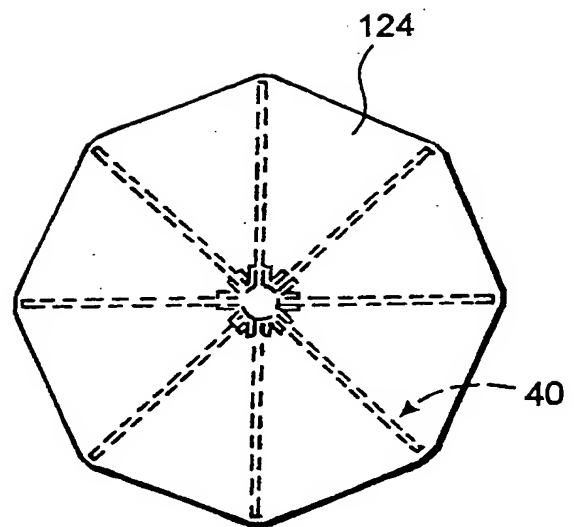


FIG. 5

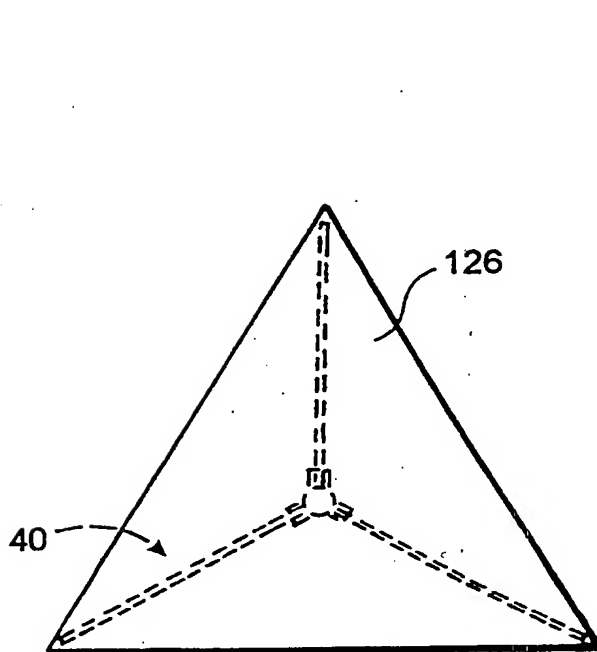


FIG. 6

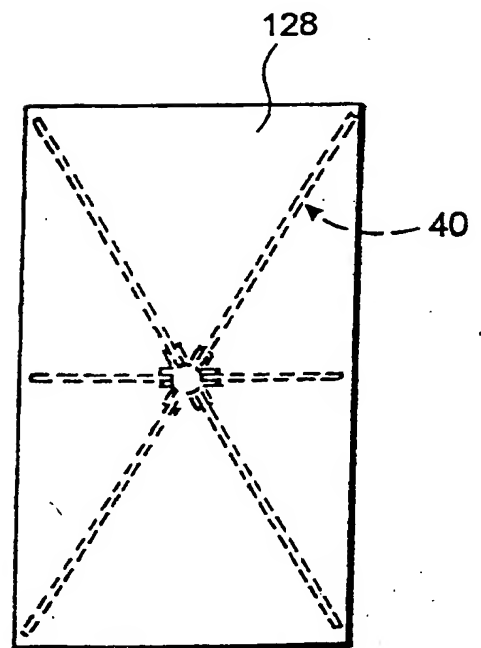


FIG. 7



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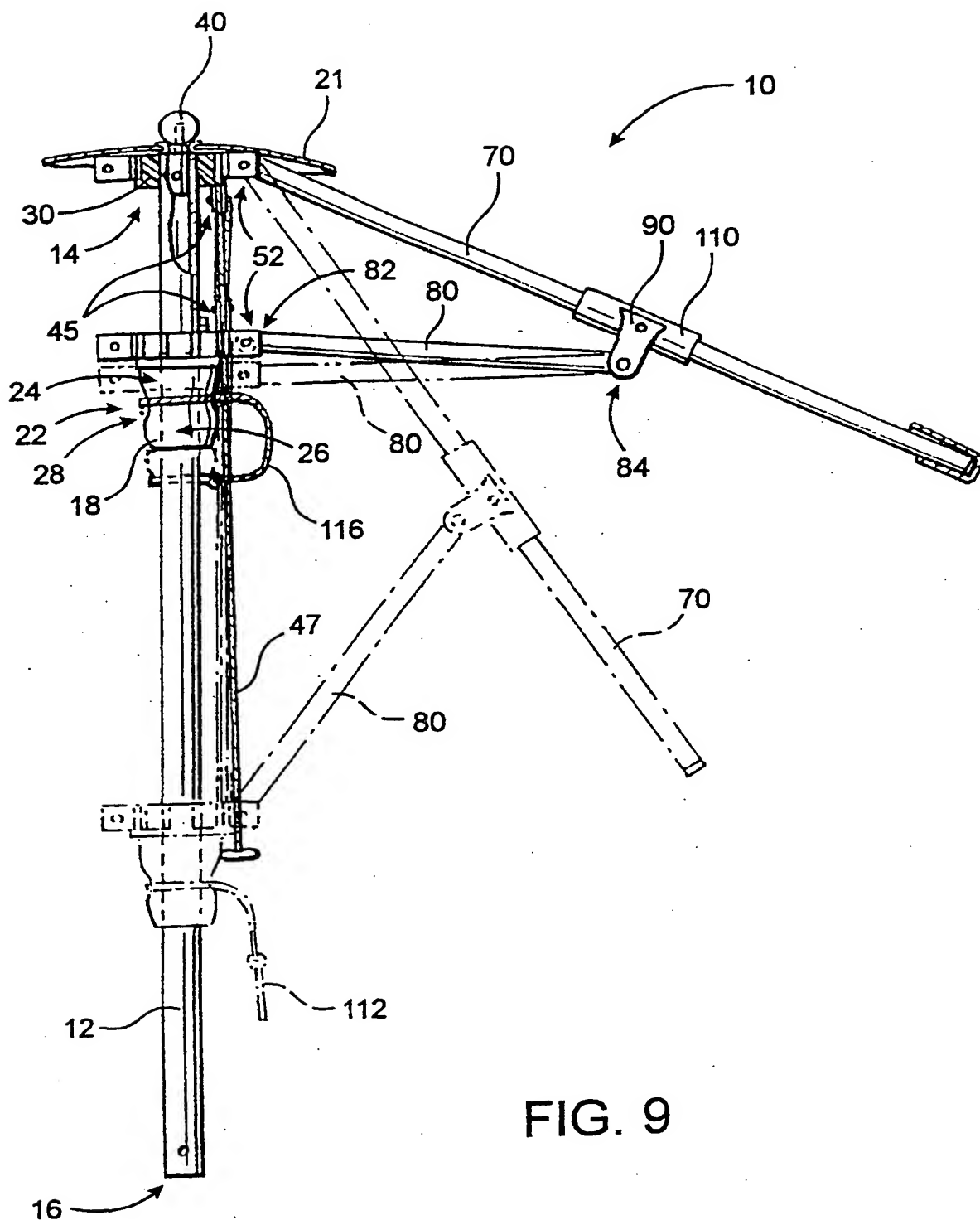


FIG. 9

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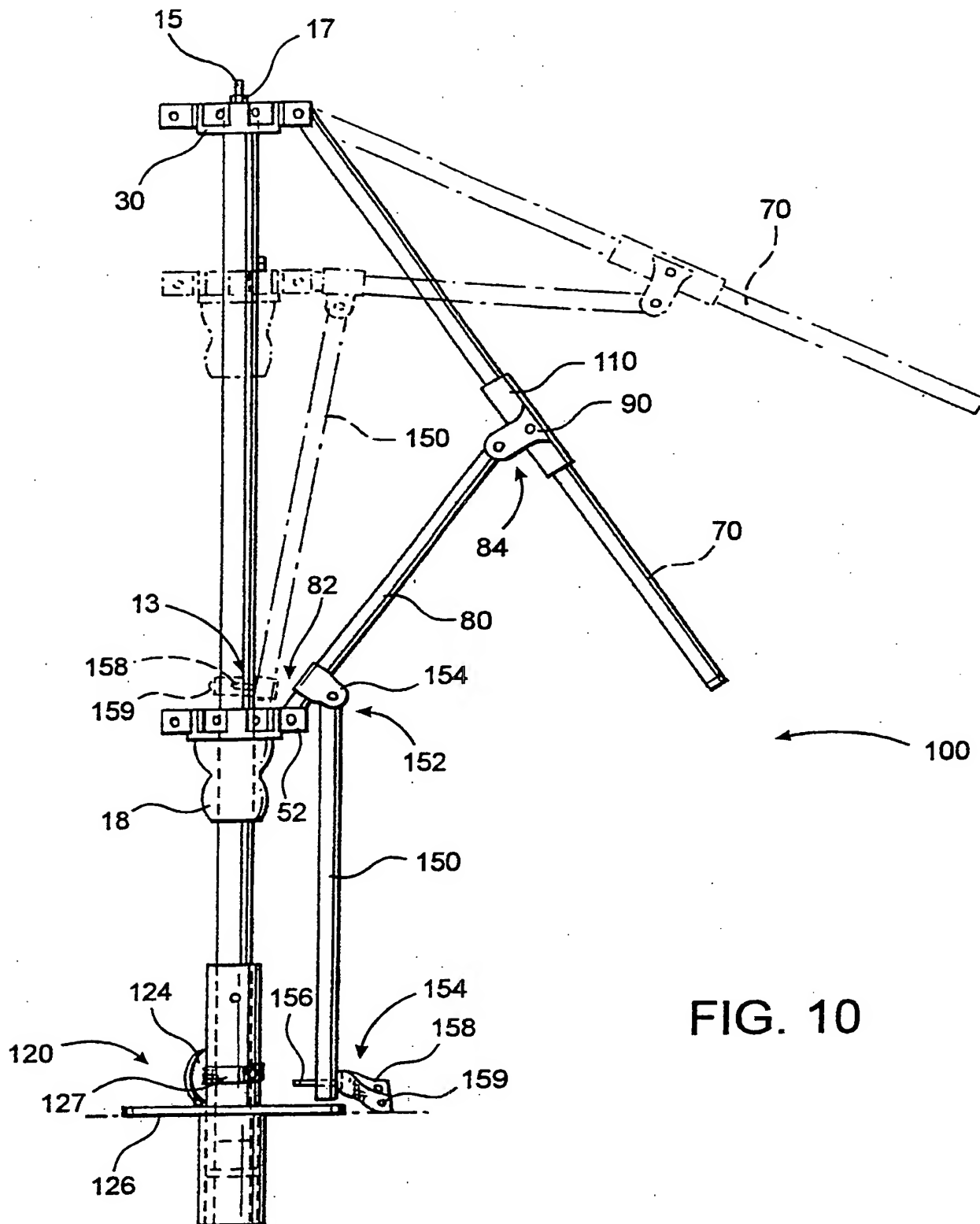


FIG. 10

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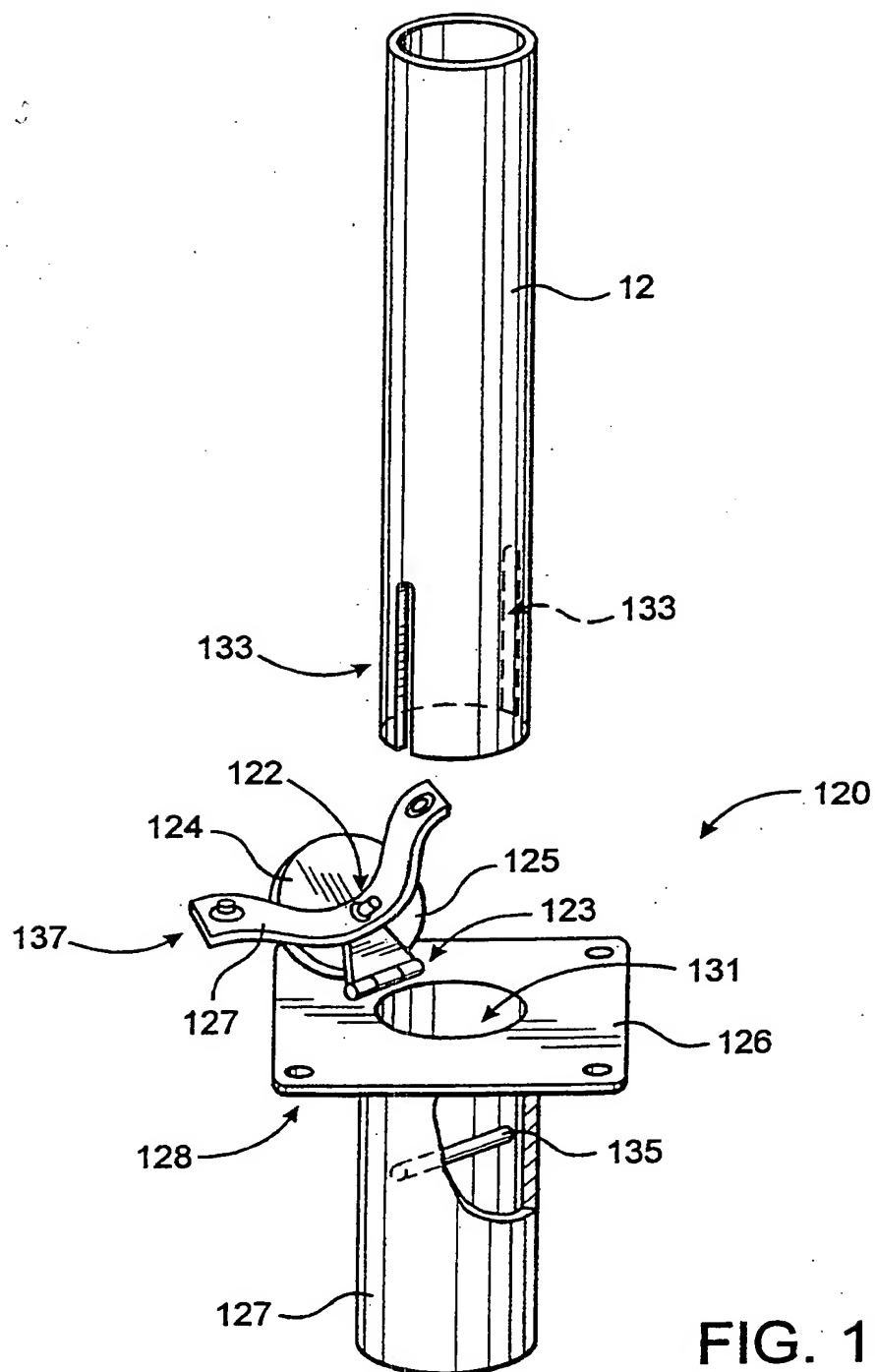


FIG. 11

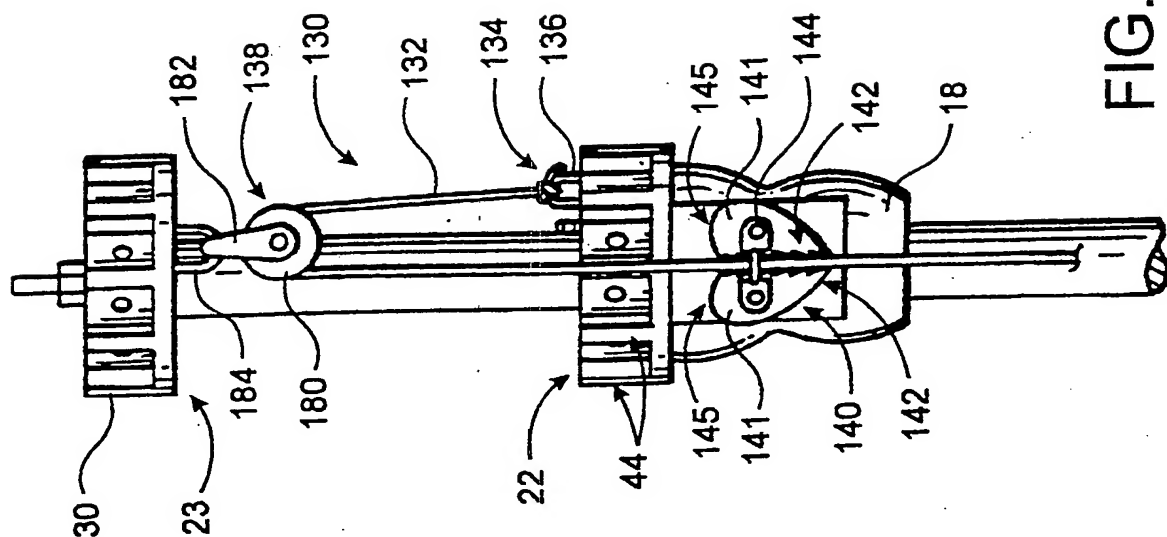


FIG. 12

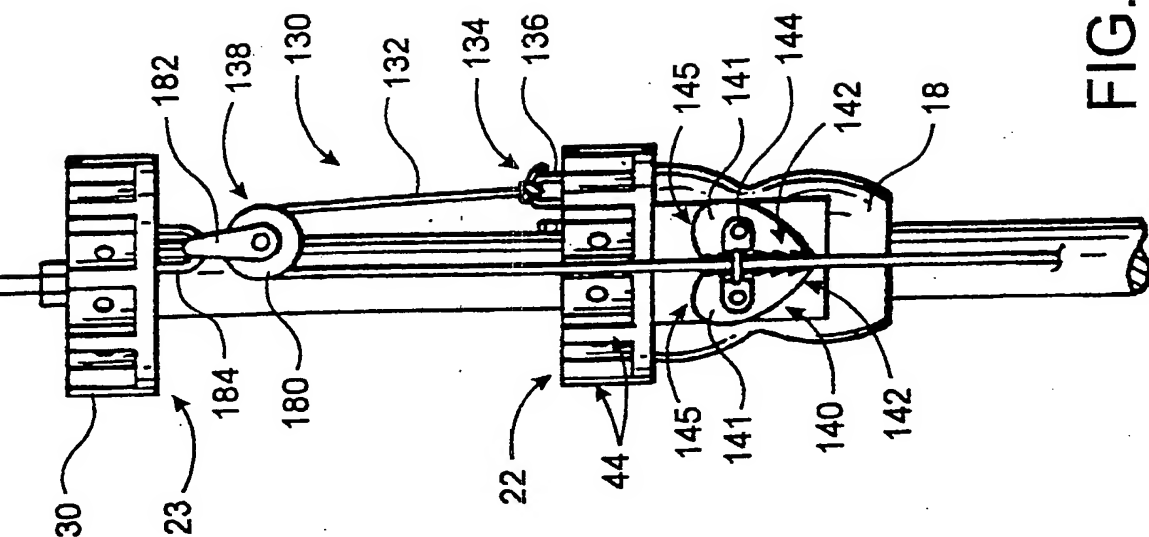


FIG. 13

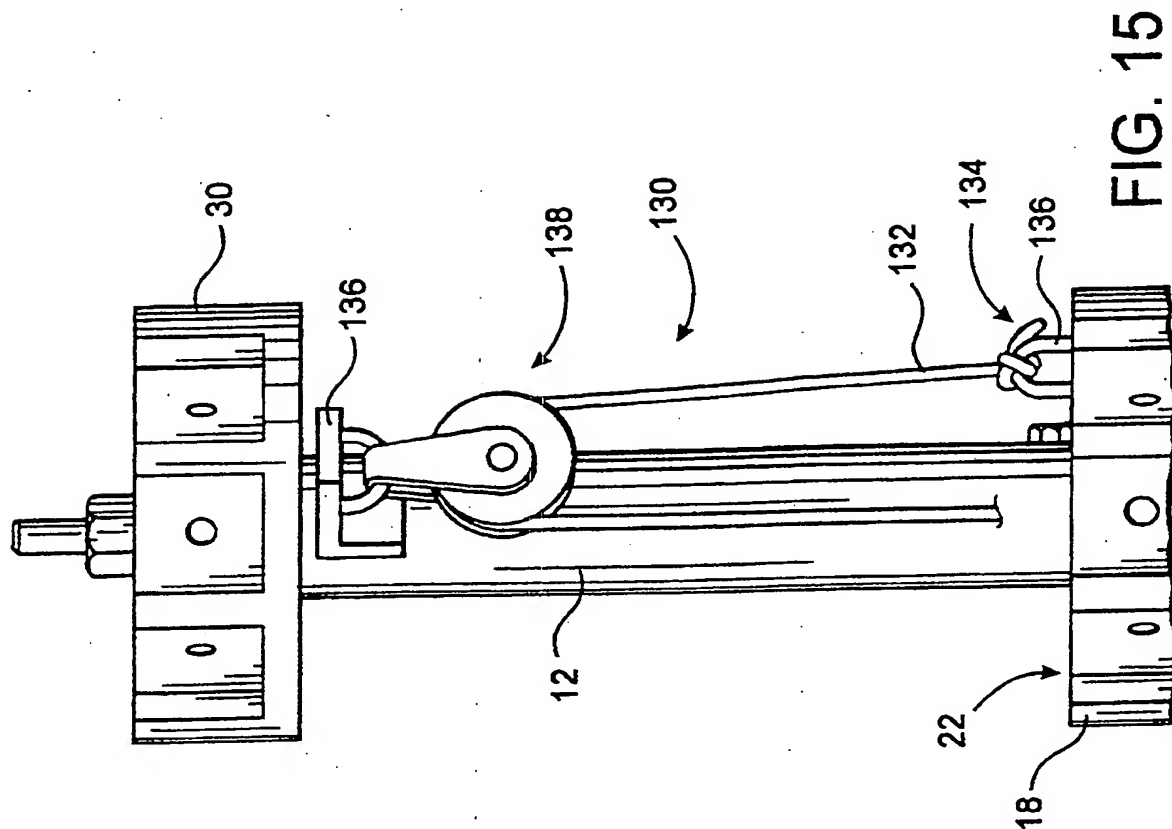


FIG. 14

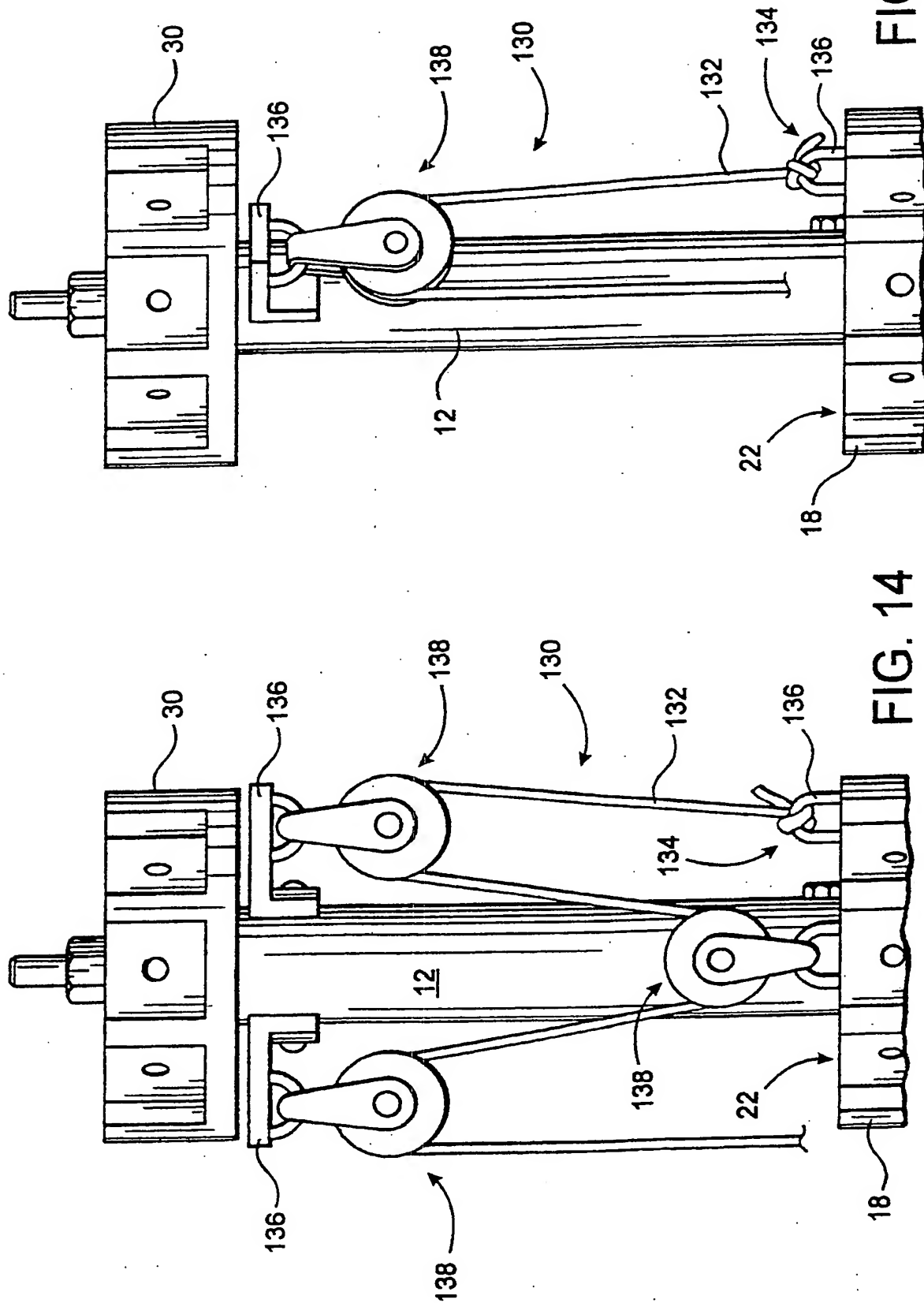


FIG. 15

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US00/16028

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) :A45B 25/02

US CL :135/20.3, 25.4, 27, 28, 29; 248/518; 403/217, 157

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 135/20.3, 25.31, 25.4, 27, 28, 29, 33.6; 248/518, 511, 523, 534; 403/217, 170, 157, 397

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X -- Y	US 4,368,749 A (LINDLER et al. ) 18 January 1983 (01.18.1983). See entire document.	1-5, 9-15, 18-19 ----- 17
X	US 5,193,566 A (Chen) 16 May 1993 (16.03.1993). See entire document.	1-16, 18-20
X -- Y	US 5,640,984 A (Dubunsky) 24 June 1997 (24.06.1997) See entire document.	23, 31 ----- 17
Y	US 5,020,557 A (Apple) 4 June 1991 (04.06.1991) See entire document.	21-22
Y	US 5,836,328 A (Lee) 17 November 1998 (17.11.1998). See entire document.	21-22

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Date of the actual completion of the international search

24 SEPTEMBER 2000

Date of mailing of the international search report

18 OCT 2000

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# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US00/16028

## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X — Y	US 2,745,421 A (RUSSELL) 15 May 1956 (05.15.1956) see entire document.	23, 31, 37-38 24, 28-30, 32-34, 36
X	US 5,355,903 A (HADDAD et al. ) 18 October 1994 (18.10.1994). See entire document.	42-43, 46-49
A	US 4,832,304 A (MORGULIS) 23 May 1989 (23.05.1989) See entire document.	40-41, 50
Y	US 4,993,445 A (DUBINSKY) 19 February 1991 (19.02.1991). See entire document.	24, 28-30, 32-34, 36
A	US 760,598 A (WYNEGAR) 24 May 1904 (24.05.1904). See entire document.	40-41, 50

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